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Plant Materials for Conservation

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Finding plants for conservation is the primary job of plant materials centers. Most of these centers are operated by the United States Department of Agriculture, Soil Conservation Service (SCS). This publication explains the work of the centers and describes many benefits of the conservation plants they have tested and released. To date, more than 140 plants released by the centers are being commercially produced by seed growers and nurserymen.

Conservation plants are needed mainly to help solve two big problems common to all parts of the United States: erosion and sedimentation. Erosion can occur wherever the soil is unprotected by vegetation or is subject to the erosive force of wind or water.

Uncontrolled erosion can be a powerful destructive force with many side effects. Wherever it occurs, it decreases the natural productivity of the soil. Eroded soil washed into streams and lakes can reduce water quality, degrade fish habitat, and increase flooding downstream.

Fortunately, however, the right kind of plant cover and management can control most erosion and sedimentation. And many plants good for controlling erosion have other conservation benefits. They provide food and cover for wildlife, beautify the landscape, increase the forage production of range and pasture, or improve the quality of the environment in a variety of ways.

But the same plant won't be equally effective in all geographical areas or for all purposes. Whether a particular plant is adapted depends on soil type, climate, land use, and other characteristics of the environment.

Cover: Maximilian sunflower, a native forb for range and pasture, wildlife food, beautification, and conservation. Two varieties, 'Aztec' and 'Prairie Gold,' have been released by Soil Conservation Service plant materials centers.

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Erosion and sedimentation are often most severe during spring runoff and snowmelt.

Plant materials centers

Manhattan, Kansas, plant materials center. In foreground are forb testing plots; in background, larger plots for advanced testing and seed increase.

When a conservation problem is identified, scientists at a plant materials center begin searching for a plant to solve it. First, they obtain native or introduced plants that seem to have potential. Then they conduct tests and comparisons that include field trials under actual-use conditions. In this way, they select the best plant for solving the problem.

In cooperation with other federal and state agencies or with universities, the center releases an approved variety of the selected plant. It also arranges for the plant's commercial production.

The centers work closely with cooperating agencies and organizations. Cooperators include state agricultural experiment stations, conservation districts, mining companies, state highway departments, and fish and wildlife agencies. Some cooperators are other federal agencies; examples are USDA's Forest Service and Science and Education Administration, the Department of the Interior's Fish and Wildlife Service and Bureau of Land Management, and the Environmental Protection Agency. Other public and private groups that need conservation plants may also be cooperators.

There are 22 plant materials centers (PMC's) in the United States. The National Plant Materials Center in Beltsville, Maryland, is the central facility for distributing plant materials from foreign sources that may be useful in programs of the 21 field PMC's.

Each field PMC serves several major land resource areas; these areas have common characteristics of climate, topography, and soil and water resources. The service area of most PMC's covers parts of two or more states.

In recent years, demands have increased for more energy from surface mines, higher production on grazing lands, and a cleaner and more attractive environment. The need for conservation plants has increased accordingly. But how

do scientists find these plants? How do they select superior varieties? And what are the plants used for?

Initial testing.—The plant materials centers begin their testing procedure only after a specific conservation problem has been identified. The first step in testing is to gather the plants that seem to have potential for solving the problem. These may be native plants or plants introduced from foreign countries by USDA's Science and Education Administration.

The plants are initially tested and compared in small plots. Although the plant scientists are mainly concerned with erosion control, they also consider a plant's possible value for specific uses, such as livestock grazing or wildlife cover, and for multiple land uses, economic development, and environmental quality.

The scientists use high standards to evaluate the plants they test. To qualify for official release by a center, a plant must grow vigorously and have other favorable growth characteristics. Specific requirements, of course, depend on how the plant is to be used and on the soil and climatic conditions where its use is planned.

For example, the plant may have to be resistant to insects and disease or tolerant to drought or cold. It may need to be able to grow well under adverse soil conditions such as salinity or steep slope. Or it may need to have high yields of fruit or forage.

The scientists carefully evaluate the plants for these and other conservation values. Then they select the superior ones for advanced testing.

Advanced testing.—The superior plants are now evaluated and compared

Initial testing of blue grama.

Initial seed increase of 'Eureka' thick-spike gayfeather, a native wildflower useful for conservation.

Advanced testing of pasture grasses on a cooperator's land.

Large-scale increase of blue grama.

with plants already commercially available. An initial increase of seed or plants is made to provide enough plant materials for advanced testing. Advanced testing is carried out both at the center and away from it at sites that resemble those for which the plants are intended. On the average, less than 1 percent of the several hundred plants assembled for the initial tests go beyond advanced testing.

Large-scale increase and final testing.—After advanced testing is complete, the superior plants are increased at the center for final testing.

This large-scale increase of seed or plants is essential because final testing is carried out in large plantings under actual-use conditions. To measure the plants' effectiveness, the scientists compare them with available varieties grown under the same management and site conditions. They make these field plantings on the land of cooperators.

Release.—When final testing is complete and the scientists have proved one plant superior, the center—jointly with cooperators—releases it for commercial production. Most grass and legume varieties are certified by the state crop improvement association or seed certifying agency. Information on the availability and uses of the plant is distributed at the time of release.

Commercial increase.—SCS or another agency, as designated at the time of release, is responsible for maintaining genetically pure planting stock. The designated agency is also responsible for making the released variety available to commercial seed growers and nurserymen. SCS does not sell plant materials to the public. It encourages commercial production, however, by seed growers, conservation districts, crop improvement associations, and state and private nurseries.

When a new conservation plant is released, the centers provide needed information to seed growers and nurserymen and to farmers, ranchers, and others who use conservation plants. This information covers how and when to plant, prepare the seedbed, fertilize, control weeds and insects, irrigate, harvest, and process the seed or plants.

Final testing of 'Cave-In-Rock' switchgrass, a warm-season pasture grass, on a cooperator's farm in Iowa.

Commercial seed production field of 'Luna' pubescent wheatgrass.

Selecting conservation plants

Planting of smooth cordgrass for field testing along a tidal estuary in Virginia.

To solve a conservation problem, a plant must grow well and control erosion under adverse climate and soil conditions. Soils may have specific limitations that restrict the choice of plants, such as toxic substances or clayey or sandy texture.

Each plant materials center works on conservation problems common throughout the nation, such as roadbank erosion. It also works on problems limited largely to the area it serves. For example, the center in Cape May Court House, New Jersey, was established to find plants that could control shoreline erosion and stabilize sand dunes along the mid-Atlantic coast.

In the West, hundreds of thousands of acres are affected by salinity and alkalinity. Most saline-alkaline soils have a poor plant cover. They produce little forage and are highly erodible.

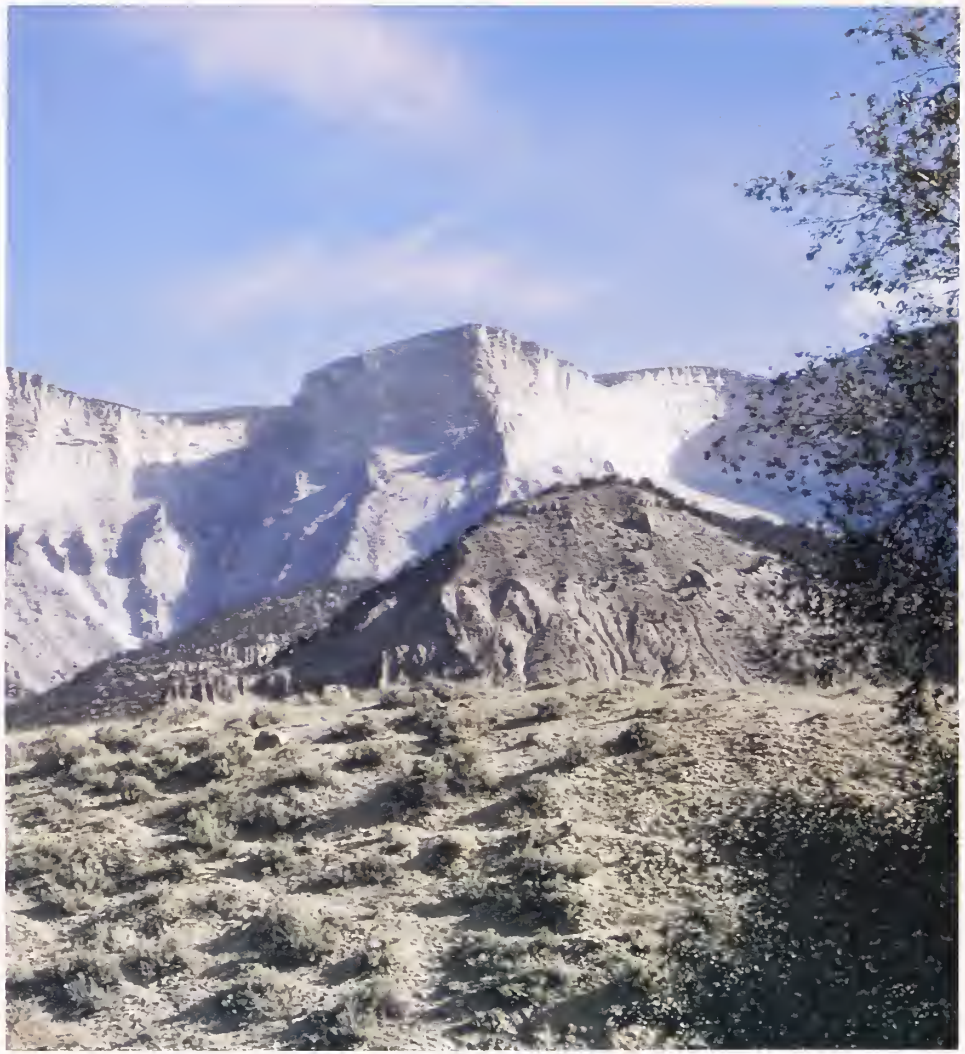
But scientists at the center in Pullman, Washington, found that a tall wheatgrass introduced from Russia grew well on many of these soils. This plant, 'Alkar' tall wheatgrass, has controlled erosion and increased forage yields on many western ranches. 'Alkar' is also used as a wind barrier in cropped fields.

The centers don't limit testing for a specific problem to only one kind of plant. Scientists have found that a compatible combination of plants generally provides the best erosion control.

These combinations or mixed plantings are also attractive and may provide other benefits. For example, flowering forbs and shrubs on a roadbank will protect the soil better than grass alone, and they will beautify the landscape much more. In a windbreak, a mixed planting of flowering and fruit-bearing shrubs and trees is attractive and provides food and cover for wildlife. In pasture plantings, a mixture of grasses and legumes can reduce fertilizer needs and increase forage production.

Test plot of 'Luna' pubescent wheatgrass, 'Rosana' western wheatgrass, and 'Manchar' smooth brome on processed oil shale.

Range and pasture



Rangeland: rugged but fragile.

Rangeland is land on which the natural vegetation is mainly grasses, grasslike plants, forbs, and shrubs. Rangeland is suitable for grazing and browsing, but it has limitations that preclude more intensive uses. It may appear rugged from a distance, but a good plant cover is required to protect the soil. Saline-alkaline soils, steep slopes, arid climate, and overgrazing add up to a poor plant cover on many rangelands. The result is low forage production, excessive erosion, and stream sedimentation.

Rangeland is one of the nation's most valuable resources. Through range plants and grazing animals, it provides food and fiber products. Rangeland also provides wildlife habitat and recreation opportunities. It can absorb and break down organic wastes and other pollutants.

Because range plants have a fairly narrow range of natural adaptation, plant scientists continue to search for native and introduced species that are better adapted to the climate, topography, and soil.

Land suitable for pasture generally has a higher potential for forage production than rangeland. It also responds more favorably to intensive management practices such as fertilization and irrigation. But to remain highly productive, most pastureland needs to be reestablished from time to time. And, like rangeland, it needs a good plant cover to control erosion.

To protect and improve range and pasture, SCS plant materials centers have tested tens of thousands of plants from all over the world. One example is 'Lana' woollypod vetch. 'Lana' is a persistent,

self-perpetuating annual legume that was introduced from Turkey. It was tested and released by the center in Lockeford, California.

'Lana' is used to increase the amount and quality of range forage. It also helps protect valuable rangeland watersheds. Cattle, sheep, and deer relish the plant in both its green and dry stages. It retains 8 to 12 percent protein in its leaves and stems after it matures, and it produces as much as 1,500 pounds per acre (1,700 kilograms per hectare) of seed. The seed is favored by quail, mourning dove, and pheasant.

In tests at the center in Palmer, Alaska, 'Lana' was found to have potential as an annual crop in that state. The Palmer PMC also tested 'Manchar' smooth brome, which previously had been cooperatively released by the Pullman and Aberdeen, Idaho, PMC's. Scientists at the Palmer center found 'Manchar' to be an excellent pasture grass for Alaska.

The Pullman PMC released 'Latar' orchardgrass for use in pasture mixtures. 'Latar' is highly productive and reaches the hay-cutting stage about the same time as alfalfa. It contains less lignin and more digestible nutrients than any of the other orchardgrasses that the center tested.

For pasturelands in the Southeast, the center in Americus, Georgia, released 'Pensacola' bahiagrass. 'Pensacola' has been seeded on several million acres in that region. The center in Brooksville, Florida, released three limpograss varieties—'Redalta,' 'Greenalta,' and 'Bigalta'—for pasture improvement. The center in Hoolehua, Hawaii, conducted further tests on these limpograsses and found them to be excellent for erosion control and forage production in that state.

Pasture of 'Latar' orchardgrass in Oregon.

Seed for improved varieties of native cool-season grasses was largely unavailable until SCS began its plant materials work. Now the seed of several improved varieties is used in many conservation programs. Some examples are 'Whitmar' beardless wheatgrass and 'Sherman' big bluegrass (released by the Pullman PMC), 'Nezpar' Indian ricegrass

Improved pasture and range have a dense cover of adapted species that protect the soil and increase forage production.

(Aberdeen PMC), 'Rosana' western wheatgrass (Bridger, Montana, PMC), and 'Barton' western wheatgrass (Manhattan, Kansas, PMC).

In the Midwest, warm-season grasses are increasingly being used to extend the grazing season after the cool-season grasses become dormant. The center in Elsberry, Missouri, tested and released 'Cave-In-Rock' switchgrass for summer pasture in the southern Corn Belt. 'Blackwell' switchgrass, released by the Manhattan PMC, is used in range seedings in the Midwest and in pasture plantings in the Midwest and Northeast.

In the Southwest, hardy drought-tolerant plants and careful management are needed to improve range condition. The center in Los Lunas, New Mexico, serves an area with 10 million acres (4 million hectares) of brushland and 6 million acres (2.4 million hectares) of abandoned or marginal cropland that should be returned to range.

The Los Lunas PMC has released several native grasses to improve range condition. They include 'Lovington' blue grama, 'Nogal' black grama, 'Vaughn' sideoats grama, 'Arriba' western wheatgrass, and 'Paloma' Indian ricegrass. The Los Lunas PMC also released 'Luna' pubescent wheatgrass, which was introduced from Russia. 'Luna' is adapted to many semiarid lands throughout the West and Southwest.

Native shrubs are important forage plants on many rangelands. The Bridger PMC released 'Wytana' fourwing saltbush for direct seeding on range. 'Wytana' can be seeded and harvested with conventional equipment.

Many native forbs are valuable forage plants for range and pasture. The Knox City, Texas, PMC tested and released 'Aztec' Maximilian sunflower for range seeding in Texas and Oklahoma. 'Aztec' can be used for grazing by deer and livestock, especially sheep and goats. The seed is relished by songbirds and quail.

Many other range and pasture plants released by the centers are helping to control erosion and increase economic returns on the nation's rangelands and pasturelands. They include Siberian wheatgrass for dryland range; weeping, Boer, Lehmann, and Wilman lovegrasses for parts of the arid Southwest; and 'Amclo' and 'Meechee' arrowleaf clovers for parts of the Southeast.

Mine spoil reclamation

Confluence of two streams, one of which is polluted by acid runoff from a coal mine.

In recent years, demands for fossil fuels and minerals have risen greatly. Strip mining, especially for coal, has increased in response to these demands. In 1978, 3.8 million acres (1.5 million hectares) of strip-mined land in the United States needed reclamation—an area almost twice the size of Yellowstone National Park.

Reclamation can be difficult. For example, strip miners remove the unwanted overburden material to get at seams of coal or other minerals. This spoil material is infertile and may contain toxic substances; many plants either cannot survive on the spoil or can produce only a sparse plant cover.

Of the 3.8 million acres needing reclamation in 1978, about 1.1 million acres (450,000 hectares) was abandoned

Without a plant cover, this spoil material from a manganese mine pollutes the stream downslope.

coal-mined land. The spoil material from many of these old mines had been piled and left without vegetation. Until this material is stabilized with vegetation, the sediment it produces can destroy nearby land values, degrade wildlife habitat, and poison water supplies.

Surface mining has greatly increased in arid and semiarid regions of the West. To reclaim these disturbed areas, drought-tolerant native grasses, forbs, and shrubs are needed.

SCS plant materials centers began testing plants for mine spoil reclamation in the 1940's. Since then, they have released more than 40 varieties that are used for this purpose. In 1975, SCS helped to establish an environmental plant center in Meeker, Colorado, to test plants for reclaiming mine spoil. The Meeker center also is testing plants for stabilizing and reclaiming processed oil shale.

Other centers have accelerated the testing of plants and techniques for their use in reclamation. The center in Big Flats, New York, released 'Tioga' deertongue, 'Arnot' bristly locust, and 'Lathco' flatpea for the acid spoils of the eastern coal mining region. The center in Quicksand, Kentucky, released 'Appalow' sericea lespedeza for reclaiming surface-mined areas in Appalachia.

For reclaiming western mine spoil, the Bridger PMC released 'Critana' thickspike wheatgrass, 'Rosana' western wheatgrass, 'Goshen' prairie sandreed, and 'Wytana' fourwing saltbush. The center in Tucson, Arizona, released 'Corto' Australian saltbush for reclamation in arid and semiarid parts of the Southwest.

'Lathco' flatpea (left), 'Arnot' bristly locust (right), and 'Tioga' deertongue (bottom) grow well on these areas of coal mine spoil.

Recreation, beautification, and environmental quality

'Rem-Red' Amur honeysuckle is an attractive ornamental for landscaping. It was released mainly for wildlife food.

'Tufcote' bermudagrass makes a durable grass cover for heavily used play areas.

Recreation areas that get heavy foot traffic—parks, ballfields, golf courses, and the like—require plants that are durable and easy to maintain. Areas used mainly for nature study have other requirements. SCS plant materials centers have released many plants for beautifying the environment and preserving its quality.

The centers have released several grasses for recreation areas subject to heavy foot traffic. Two examples are 'Durar' hard fescue (Pullman PMC) and 'Tufcote' bermudagrass (Beltsville National PMC). Both grasses are drought tolerant and wear resistant.

To beautify plantings for erosion control along highways in the Midwest and Great Plains, the Manhattan PMC is testing native wildflowers. It is also testing ways to plant, propagate, and harvest wildflowers. 'Kaneb' purple prairieclover and 'Nekan' pitcher sage are two Manhattan PMC releases. These plants can be planted in their natural prairie habitat to help restore the natural plant community. They also make attractive erosion control plants for utility corridors, parks, roadside rests, urban areas, and watershed structures.

Some native species are threatened or endangered, and several have potential for use in conservation programs. The center in Knox City is maintaining stock of a few species native to Texas and Oklahoma that are potentially useful in conservation programs. The center is testing and selecting them for conservation uses. As a result some unique, beautiful, and useful species will be preserved.

Controlling erosion and reducing

Two wildflowers for conservation and beautification: 'Prairie Gold' Maximilian sunflower and 'Kaneb' purple prairieclover.

sedimentation are the two major ways that conservation plants benefit the environment. But other environmental benefits have become increasingly important in recent years.

For example, restrictions on herbicides are forcing utility companies to look for other ways to control trees and brush in rights-of-way. Mechanical or hand removal is costly. To help suppress woody invaders, scientists at the centers are testing both new varieties and those previously released for other purposes. Herbaceous plants that tend to dominate a site, such as 'Lathco' flatpea and 'Chemung' and 'Emerald' crownvetches, are showing promise.

Waste disposal is another environmental benefit of conservation plants. Canneries, meatpacking plants, and other food processors in many areas now must dispose of wastes in the soil rather than in streams. Plant scientists at the centers are working with SCS soil scientists to test plants as cover crops that will help prevent various kinds of waste from contaminating water supplies.

'Lathco' flatpea, released for reclaiming mine spoil, helps suppress woody invaders in rights-of-way.

Wildlife habitat

As urban development and other intensive land uses expand, wildlife habitat is diminished in extent and quality. There is a corresponding decrease in the number and often the kinds of wildlife that the remaining habitat can support. Large single-crop farms replace natural habitat with a far less diverse plant community.

'Cardinal' autumn-olive is used to reclaim mine spoil, stabilize roadbanks, and beautify urban areas; moreover, each year a single plant can produce 80 pounds (35 kilograms) of fruit that is eaten by about 15 species of birds.

In selecting conservation plants, scientists consider their value for habitat to be an important criterion. For example, the Corvallis, Oregon, PMC released 'Marshfield' big trefoil. One of its many uses is as a pasture plant for elk and other big game in the Northwest.

SCS has released several woody plants that have value for wildlife. These include 'Rem-Red' Amur honeysuckle, 'Midwest' Manchurian crabapple, 'Roselow' Sargent crabapple, 'Cardinal' autumn-olive, and 'Pink Lady' winterberry euonymus.

'Natob' bicolor lespedeza, 'VA-70' shrub lespedeza, and Thunberg lespedeza are preferred food and cover plants for quail in the Southeast. 'Natob' was released by the Beltsville National PMC. It can be planted along woodland borders or used as a wildlife hedge. 'VA-70' is a herbaceous plant that can be seeded in erosion control mixtures along stream channels; this combination creates excellent habitat by supplying food, shelter, and water in the same area. Thunberg lespedeza is used for quail food and cover on hunting preserves and plantations.

In the South there was need for a proso millet that could produce a heavy seed crop to attract game birds, particularly doves. 'Dove' proso millet, an introduction from India, was tested and released jointly by the center in Americus and the Georgia Agricultural Experiment Station.

The Coffeeville, Mississippi, PMC released 'Chiwapa' Japanese millet as a food plant for migrating waterfowl. It is planted on land that can be flooded in the fall after the millet seed is mature.

'Pink Lady' winterberry euonymus, besides being an excellent food plant for songbirds, is an attractive ornamental and can be used as a screen or noise barrier around campgrounds and industrial sites.

Roadside stabilization

SCS plant materials centers cooperate with state highway departments to find plants that will stabilize roadsides. The best plants are those that need little maintenance, grow a dense root system that can take hold on steep slopes, and tolerate droughty sites.

The centers have released many plants suitable for roadside stabilization. Some examples are 'Emerald' crownvetch, 'Zorro' annual fescue, 'Appalow' sericea lespedeza, and 'Kalo' dwarf English trefoil.

'Emerald' crownvetch produces a dense and attractive cover that stabilizes this steep, rocky roadbank.

'Durar' hard fescue has exceptionally high root production, about 19,000 pounds per acre (21,000 kilograms per hectare). Since the stands improve with age and the roots are fibrous, fine, and tough, 'Durar' is ideal for stabilizing steep roadbanks.

Several grasses for roadsides were tested cooperatively by the Manhattan PMC and the state of Nebraska. As a result, low-maintenance, short-growing native grasses are saving the state about $500,000 each year on mowing highway roadsides.

The Lockeford PMC has worked with California's highway department to find fire-resistant grasses for roadsides and firebreaks. In many foothill and mountain areas, brush fire is a severe hazard. The dense native brush ignites readily, and fire spreads rapidly and is extremely difficult to control.

Firebreaks are cut to halt the spread of fire and provide access for firefighting equipment in the rough terrain, but the brush soon reinvades. The Lockeford PMC found that 'Perla' koleagrass and 'Luna' pubescent wheatgrass could be seeded on cleared firebreaks to prevent erosion and slow the reinvasion of the brush.

Some conservation plants even help protect wildlife and highway travellers from traffic accidents. 'Sodar' streambank wheatgrass is used in roadside plantings throughout the West. 'Sodar' was released jointly by the Aberdeen and Pullman PMC's. This grass is relatively unpalatable to deer and other foraging animals. Because these animals are not likely to graze edges of highways planted to 'Sodar,' hazards to travellers and wildlife are reduced.

Streambanks, shorelines, sand dunes, and watershed structures

Lacking a dense protective cover at water's edge, this shoreline has been severely eroded.

Where land and water meet, special care is needed to control erosion. When streambanks erode, valuable soil is washed away. Shoreline erosion can damage beaches and erode the banks of coastal sounds and tidal areas. Sand dunes in coastal areas are susceptible to wind erosion and to wave erosion from severe storms. Wave action can destroy inadequately protected watershed structures in inland areas.

A good plant cover can protect many of these critical areas. Plant materials centers have tested and released several plants for stabilizing shorelines and streambanks. For example, 'Halifax' maidencane was released by the Coffeeville PMC for use in the South.

'Streamco' purple-osier willow helps protect streambanks even during flood flows.

'Cape' American beachgrass protects this beach from erosion by wind and coastal rainstorms.

'Halifax' is particularly effective where the water level fluctuates along the shores of ponds, lakes, and streams. It is transplanted to the waterline, where it grows up the banks and into the water. This insures an adequate cover when the water level fluctuates.

The Big Flats PMC released 'Streamco' purpleosier willow for streambanks throughout the Northeast and in parts of the Midwest. 'Streamco' produces a dense cover that helps protect the banks even during flood flows caused by severe storms.

Seashore paspalum is a perennial creeping grass that is especially tolerant to brackish water. It grows wild in many tropical and subtropical parts of the world. In the United States it is found in Hawaii and along the Gulf and Atlantic coasts as far north as North Carolina.

Scientists at the Hoolehua PMC found that seashore paspalum is excellent for stabilizing the shorelines of ponds, canals, and streams having either fresh or brackish water. In these areas it forms a thick mat of growth slightly above and below the normal water level. It also grows along ocean beaches at and slightly above the normal high tide level, where it makes a tight protective cover if soil fertility is adequate.

The Cape May PMC released 'Cape' American beachgrass and 'Emerald Sea' shore juniper. These plants can be used to stabilize and build sand dunes along the mid-Atlantic coast.

The Corvallis and Pullman PMC's developed ways to stabilize sand dunes in the Pacific Northwest. Initially the sand is stabilized with European beachgrass. Then, adapted perennial grasses and legumes or trees and shrubs are planted for permanent protection.

The Knox City and Manhattan PMC's are testing plants and techniques for stabilizing watershed structures and the shores of lakes and reservoirs. The Knox City PMC released 'Alamo' switchgrass and 'Shoreline' common reed for these purposes.

This earthen watershed structure is protected by 'Shoreline' common reed.

Windbreaks and shelterbelts

Each year an average of about 5.5 million acres (2.2 million hectares) of cropland in the United States is damaged by wind erosion.

High winds not only erode unprotected soil but also can destroy crops. If the soil is used to grow crops that produce only small amounts of residue, it is especially susceptible to wind erosion.

The center in Bismarck, North Dakota, tested and released 'Midwest' Manchurian crabapple as a fruit-bearing shrub for windbreaks in the intensively cultivated areas of the upper Great Plains. 'Midwest' consistently produces fruit that helps sustain wildlife through the winter. 'Roselow' Sargent crabapple, released by the center in East Lansing, Michigan, has uses similar to 'Midwest.' It is adapted to areas from the Midwest to western Oregon.

Shelterbelts are borders of trees that protect feedlots and farmsteads from cold winter winds and the heat of summer, thus reducing heating and cooling costs. They also help keep snow from drifting against buildings. Many trees used for windbreaks are also suitable for shelterbelts.

The Los Lunas PMC released 'King-Red' Russian-olive for shelterbelt and windbreak plantings in the Southwest. This tree also provides food and cover for wildlife.

Many conservation plants, mainly trees and shrubs, are useful as screens and noise barriers. 'Barranco' desertwillow, another Los Lunas release, is an attractive plant for screens and windbreaks. It is also a good general landscaping plant for roadsides, rest areas, homesites, and parks and other recreation areas. 'Flame' Amur maple, an Elsberry PMC release, has similar uses.

Traditionally, windbreaks along cropped

'Midwest' Manchurian crabapple makes an attractive windbreak. The fruit stays on the tree through much of the winter, providing food for birds.

Well-planned shelterbelt in South Dakota.

fields have consisted of trees and shrubs. But grass barriers can also be effective if they are designed to fit the soils, cropping system, and prevailing wind direction. Some farmers plant strips of tall wheatgrass, switchgrass, or other tall grasses in their fields. These grasses require less space and moisture and are easier to establish than woody plants.

'Alkar' tall wheatgrass, originally released for pasture and range plantings by the Pullman PMC, makes a highly effective wind barrier in cropped fields. It is stiff stemmed and grows as tall as 6 feet (2 meters). 'Alkar' is adapted throughout much of the West and the Great Plains.

Because of its stiff stems, 'Alkar' tall wheatgrass is an effective wind barrier throughout the year.

Cover crops

Many soils are highly erodible because of topography or intensive land use. In addition, some soils have physical properties that make them more erodible than others.

Grass waterways and diversions are conservation practices that help protect erodible areas in cultivated fields. They slow the runoff water and carry it off the fields to a safe outlet. To prevent gullying and severe sheet and rill erosion during heavy rains, however, waterways and diversions require sturdy grasses. Plant materials centers have released several grasses suitable for these areas.

Orchards require a stabilizing cover between the tree rows. In some young California orchards, annual soil loss from erosion was as much as 200 tons per acre (450 metric tons per hectare). This means an annual loss of more than 1 inch (about 3 centimeters) of topsoil.

To stabilize the soil between the tree rows, the Lockeford PMC tested 'Blando' soft brome, an annual grass that the center had previously released for reseeding rangeland. 'Blando' is easy to manage and has a dense, fibrous root system. Furthermore, since it matures and sets seed early, it doesn't compete with young trees for moisture during the dry season.

In the Pacific Northwest, erosion is a hazard all year long and orchards need a permanent cover. The Aberdeen PMC released 'Pomar' orchardgrass, a dwarf variety that doesn't compete with fruit trees and provides year-round cover.

In the Midwest, chemicals used for weed control also kill the cool-season grasses often planted in waterways and field borders. The Elsberry PMC found that several warm-season native grasses such as 'Cave-In-Rock' and 'Blackwell' switchgrasses are tolerant to these chemicals.

Grass waterway of 'Garrison' creeping foxtail in Alaska. 'Garrison' was released mainly for pasture on poorly drained sites. Highly palatable to livestock, it is exceptionally frost tolerant and starts growth early in spring.

Cultural practices

Pitting is a technique that conserves available moisture on arid and semiarid rangelands.

Over the years, the centers have come up with many new and improved cultural practices used with conservation plants. Cooperators, especially state agricultural experiment stations, have made many very valuable contributions. Improved practices usually result from the work of many agencies and individuals.

One improved practice deals with seed cleaning. The seeds of many conservation plants, particularly some very useful native grasses such as big bluestem and indiangrass, are small or trashy (having awns, fluffy appendages, or burs). These seeds are difficult to plant with mechanical seeders. Scientists at several centers cooperated to develop a technique for using a modified hammer mill; they adjusted the cylinder speed and screen size to remove seed appendages.

Some seeding mixtures contain many different sizes of grass and legume seed. Scientists at the Lockeford center found that rice hulls or cracked and screened barley could be used as a diluent. This helped distribute the seed evenly.

The centers, in cooperation with equipment manufacturers, have adapted machinery to harvest and clean the seed of uncommon conservation plants, to plant trashy seeds of native grasses, and to reseed abandoned cropland and depleted range.

In grass-legume mixtures, competition between the plants can be a serious problem if grasses and legumes are seeded in the same row. In warm, dry areas the legume seedlings may crowd out the grasses; in cool, moist areas the reverse can occur.

But plant scientists found that

alternate-row seeding reduces competition during the seedling stage. The result is a better balance of grass-legume forage. Also, in climates where the grasses would otherwise likely dominate the pasture, alternate-row seeding allows a higher percentage of the nitrogen-fixing legumes in the mixture.

Sand dunes in both inland and coastal areas require special techniques to insure a good plant cover. The Pullman center found a way to build and stabilize sand dunes. First, fences are used to slow the wind and cause sand to collect around them, forming a foredune. When the foredune reaches the desired height, European beachgrass is planted to provide a temporary cover and cause more sand to collect. Then, after the new dune has been initially stabilized by the beachgrass, selected grasses and legumes or woody plants are planted for permanent protection.

Flood-retarding structures and the shorelines of lakes and reservoirs can be severely eroded by wave action. The damage can be particularly severe during high winds. Controlling this erosion with riprap is costly. The Knox City and Manhattan centers selected water-tolerant plants with strongly rhizomatous or extensive fibrous root systems, for example, 'Shoreline' common reed. They also developed techniques for propagating and transplanting the selected plants.

Snow fences help build sand dunes along the Lake Michigan shoreline.

On many rangelands, rainfall is low or is poorly distributed through the growing season. The centers came up with two techniques—pitting and blading pits—that create small furrows or basins to conserve the available rainfall.

A mulch cover benefits newly seeded grass waterways and other critical areas in a variety of ways. It helps prevent the seed from being washed or blown away and protects seedlings from erosion until they are firmly established. It also conserves moisture.

But mulching effectively can be difficult on critical sites. A mulch of loose straw, for example, can be readily washed or blown away. Scientists at the Big Flats center found that a coarse netting of jute fiber anchored to the soil helps greatly in establishing a grass cover on waterways.

Visit your PMC

The staff of the plant materials center in your area invite you to visit singly or with a group. They welcome visits from seed producers, researchers from other public agencies and private organizations, conservation district cooperators, farmers and ranchers, and others interested in conservation plants. The staff conduct tours of the center's facilities and explain ongoing projects.

Addresses and phone numbers of the centers generally are listed in local telephone directories under "United States Government, U.S. Department of Agriculture, Soil Conservation Service."

State	City
Alaska	Palmer[1]
Arizona	Tucson
California	Lockeford
Colorado	Meeker[2]
Florida	Brooksville
Georgia	Americus
Hawaii	Hoolehua
Idaho	Aberdeen
Kansas	Manhattan
Kentucky	Quicksand
Maryland	Beltsville[3]
Michigan	East Lansing
Mississippi	Coffeeville
Missouri	Elsberry
Montana	Bridger
New Jersey	Cape May Court House
New Mexico	Los Lunas[4]
New York	Big Flats
North Dakota	Bismarck[5]
Oregon	Corvallis
Texas	Knox City
Washington	Pullman

[1]State-operated center receiving technical help from SCS.

[2]Upper Colorado Environmental Plant Center operated by the White River and Douglas Creek Soil Conservation Districts.

[3]National Plant Materials Center.

[4]Operated by New Mexico State University.

[5]Operated by the North Dakota Association of Soil Conservation Districts.

At the plant materials centers, tours are available to anyone interested in seeing how plants are tested and selected for conservation.

August 1979

List of plant names*

Common name	Scientific name
American beachgrass	*Ammophila breviligulata*
Amur honeysuckle	*Lonicera maackii*
Amur maple	*Acer ginnala*
annual fescue	*Festuca megalura*
arrowleaf clover	*Trifolium vesiculosum*
Australian saltbush	*Atriplex semibaccata*
autumn-olive	*Elaeagnus umbellata*
bahiagrass	*Paspalum notatum*
beardless wheatgrass	*Agropyron inerme*
bermudagrass	*Cynodon dactylon*
bicolor lespedeza	*Lespedeza bicolor*
big bluegrass	*Poa ampla*
big bluestem	*Andropogon gerardii*
big trefoil	*Lotus pendunculatus*
birdsfoot trefoil	*Lotus corniculatus*
black grama	*Bouteloua eriopoda*
blue grama	*Bouteloua gracilis*
Boer lovegrass	*Eragrostis chloromelas*
bristly locust	*Robinia fertilis*
common reed	*Phragmites australis*
creeping foxtail	*Alopecurus arundinaceus*
crownvetch	*Coronilla varia*
deertongue	*Panicum clandestinum*
desertwillow	*Chilopsis linearis*
dwarf English trefoil	*Lotus corniculatus* var. *arvensis*
European beachgrass	*Ammophila arenaria*
flatpea	*Lathyrus sylvestris*
fourwing saltbush	*Atriplex canescens* var. *aptera*
hard fescue	*Festuca longifolia*
indiangrass	*Sorghastrum nutans*
Indian ricegrass	*Oryzopsis hymenoides*
Japanese millet	*Echinochloa crusgalli* var. *frumentacea*
koleagrass	*Phalaris aquatica*
Lehmann lovegrass	*Eragrostis lehmanniana*
lespedeza	*Lespedeza japonica*
limpograss	*Hemarthria altissima*
maidencane	*Panicum hemitomon*
Manchurian crabapple	*Malus baccata* var. *mandshurica*
Maximilian sunflower	*Helianthus maximiliani*
orchardgrass	*Dactylis glomerata*
pitcher sage	*Salvia azurea* var. *grandiflora*
prairie sandreed	*Calamovilfa longifolia*
proso millet	*Panicum miliaceum*
pubescent wheatgrass	*Agropyron trichophorum*
purpleosier willow	*Salix purpurea*
purple prairieclover	*Petalostemum purpureum*
Russian-olive	*Elaeagnus angustifolia*
Sargent crabapple	*Malus sargenti*
seashore paspalum	*Paspalum vaginatum*
sericea lespedeza	*Lespedeza cuneata*
shore juniper	*Juniperus conferta*
Siberian wheatgrass	*Agropyron sibiricum*
sideoats grama	*Bouteloua curtipendula*
smooth brome	*Bromus inermis*
smooth cordgrass	*Spartina alterniflora*
soft brome	*Bromus mollis*
streambank wheatgrass	*Agropyron riparium*
switchgrass	*Panicum virgatum*
tall wheatgrass	*Agropyron elongatum*
thickspike gayfeather	*Liatris pycnostachya*
thickspike wheatgrass	*Agropyron dasystachyum*
Thunberg lespedeza	*Lespedeza thunbergii*
weeping lovegrass	*Eragrostis curvula*
western wheatgrass	*Agropyron smithii*
Wilman lovegrass	*Eragrostis superba*
winterberry euonymus	*Euonymus bungeanus*
woollypod vetch	*Vicia dasycarpia*

*Cultivar names, such as 'Cape' American beachgrass, are not given here but are given in the text.

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